Environmental health is a discipline that can stimulate our best instincts to be considerate of all people and creatures on this planet.

Parting Thoughts

It has been said that there is no stronger urge than the urge to edit someone else's writing. Upon my retirement from the National Institute of Environmental Health Sciences (NIEHS), and concurrently from my position as co-editor-in-chief of *Environmental Health Perspectives*, I find that perhaps the stronger urge is not to edit but rather to editorialize. Therefore, I would like to provide some parting thoughts, and with them hopefully some insights gained from my experiences, which have spanned the broad spectrum of environmental health, from basic science to public health policy to science communication. In a 30-year career in environmental health, I have witnessed the expansion of the field as both a scientific discipline and a global movement. In looking forward, I feel that there are some major components which environmental health must enthusiastically encompass if it is to continue to provide real answers to some of the most pressing issues of our day.

Mechanism-based toxicology must be the centerpiece of any effective strategy for meeting the challenges of providing the public with better answers to complex public health questions. Clearly, the controversies that surround dose–response relationships, selection of appropriate models for extrapolating human responses to environmental insult, and the factors that are responsible for interindividual variations in susceptibility to adverse health effects can only be addressed if we make appropriate use of new technologies and our exploding knowledge of fundamental biologic processes. Yet, we should not become unthinking and arrogant slaves to the technology itself. Instead, we must employ sound scientific judgment in asking the right questions and in interpreting the results in a credible fashion.

As part of this process, we must continue to lessen our use of animals in environmental health research. The impressive development of cell-based toxicology systems offers the opportunity to achieve a panel of toxicity tests that are faster, more sensitive, more specific, and cheaper than existing long-term bioassays in rodents or other species for assessing cancer and other effects. Although I agree that we must seize this opportunity to diminish our reliance on animal bioassays, I expect that decreased animal usage will be gradual and will continue into the foreseeable future if we are to meet our mandates of public health protection.

Just as we look to the common physiologies of people and animals for health answers, so should we look to the common ground between human and ecologic health. We often drift away from the concept of the connections between humans and their total environment, and, in doing so, we inappropriately narrow our perspective. Most of the major environmental health issues of our day, including global warming, endocrine disruptors, the causes of malformed frogs, and toxic organisms such as Pfisteria emphasize the need to seek and define this common ground in our research strategies and in our health policy decisions.

With these goals comes the inevitable realization that resources of all types—time, money, and humans—are limited and thus, priorities must be set. It has been said that you can have it all, just not at the same time, and I believe this to be true. What this means is that we have to choose well in setting environmental health priorities if we are to make the best uses of the resources available to us. This is often an extremely difficult task. For example, setting testing priorities for the National Toxicology Program (NTP) presents a host of challenges; there are 80,000 chemicals in commerce today, many of which have not undergone adequate toxicologic evaluation. The question is, of course, where to begin. Among our top priorities for toxicologic evaluation, we must include DNA-based products, herbal medicines, chemical mixtures, and phototoxicity.

In performing such evaluations, as with all environmental health research, we must adopt a multidisciplinary approach to research. Many times the invocation to multidisciplinary research is often merely rhetoric and does not represent a true desire to understand a different perspective. My hope is that the critical environmental issues of our day will foster effective interactions among disciplines and that all stakeholders, be they basic scientists, toxicologists, mathematicians, epidemiologists, risk assessors, ecologists, public health officials, or public citizens, will work together to achieve environmental health gains. To do this we must always strive for objectivity, work toward consensus, never disdain negotiation, and acquire an understanding of the diverse points of view that surround environmental health issues.

Preparation for these efforts requires training. Such training poses unique challenges because of the extraordinarily broad scope of activities and disciplines housed under the umbrella of environmental health research. However, progress in such research and its linkage to public health policy demands a significant and sustained training effort by the NIEHS and other federal agencies. Senior scientists and managers must take their mentoring responsibilities seriously and provide to their employees real opportunities to learn in an atmosphere that fosters creativity, goodwill, and a sense of service.

This is especially true for those who work for public scientific agencies and organizations. We must remember who pays our salaries and funds our research, and guard against becoming nonresponsive to public concerns over environmental and health issues. We must remember that the public has a right to know, and we have an obligation to provide understandable information on what we do, why we do it, and what we think it means; and to listen and change what we do when called upon by our "real bosses." Environmental health institutions must recognize that communication is a two-way street, best served by effective interactions throughout an entire process be it regulatory decision making or formulation of scientific strategies, not just the reporting of a decision at the end. To facilitate this process, journals such as *EHP* have an obligation to provide accurate and understandable information on important issues in a timely manner.

In making the decision to come to the NIEHS and to stay here for 30 years, I have been privileged to work with those at the NIEHS, as well as many agencies, organizations, and institutions in the United States and abroad, on the common goals of global human health and a healthy environment. As my final parting thought, I would like to thank the dedicated, talented, and hard-working people who have made environmental health a discipline that can stimulate our best instincts to be considerate of all people and creatures on this planet.

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